

CLAIMS

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1. A polarized light color filter, comprising a first polarized light converting element, a first polarization spectroscopic element, a second polarized light converting element, a second polarization spectroscopic element, a third polarized light converting element and a third polarization spectroscopic element, which are sequentially accumulated but the first polarized light converting element being provided on transmission side, wherein each of said first, the second and the third polarized light converting elements is designed for being capable of selectively emitting the incident light, which has been polarized to the P-polarized light or to the S-polarized light, either after converting to the other polarized light or as it is by controlling the voltage applied thereto; said first, the second and the third polarization spectroscopic elements are composed of the first, the second and the third narrow-band polarization spectroscopic elements designed for being capable of reflecting only the S-polarized light components of the first, second and third primary lights corresponding to the primary colors corresponding to the three primary colors while transmitting other components.

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2. The polarized light color filter according to claim 1, wherein the first wide-band polarization spectroscopic element, designed for being capable of reflecting the S-polarized light component of the incident light over the whole range of the visible lights while transmitting the P-polarized component, is provided on the incident light side of the first polarized light converting element.

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3. The polarized light color filter according to claim 1, wherein the first wide-band polarization spectroscopic element, designed for being capable of reflecting the S-polarized component of the incident light over the whole range of the visible lights while transmitting the P-polarized light component,
5 is provided on the incident light side of the first polarized light converting element; the fourth polarized light converting element, designed for being capable of selectively outputting the incident light, which has been converted to the P-polarized light or the S-polarized light, after converting to the other polarized light or as it is by controlling the voltage applied thereto, is
10 provided on the emission side of the third polarization spectroscopic element.

4. The polarized light color filter according to claim 1, comprising the first wide-band polarization spectroscopic element, designed for reflecting the S-polarized light component of the incident light over the whole range of the visible lights while transmitting the P-polarized light, provided on the incident light side of the first polarized light converting element, the fourth polarized light converting element, designed for selectively emitting the incident light, which has been polarized to the P-polarized light or the S-polarized light, after converting to the other polarized light or as it is by controlling the voltage applied thereto, and the second wide-band polarization spectroscopic element capable of reflecting the S-component of the incident light while transmitting the P-polarized component over the whole range of the visible lights, provided on the emission side of the third polarized light converting element.
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5. The polarized light color filter according to claim 1 formed by accumulating the first, second and third polarized light converting elements and the first, second and third narrow-band polarization spectroscopic

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elements on the transparent substrate.

6. The polarized light color filter according to claim 1, wherein the first, second and third polarized light converting elements and the first, second and third narrow-band polarization spectroscopic elements are accumulated and interposed between the inclines of the two pieces of rectangular prisms, which forms a rectangular parallelepiped when joined by their respective inclines.

10 7. The polarized light color filter according to claim 1, comprising the first, second and third polarized light converting elements and the first, second and third narrow-band polarization spectroscopic elements which are accumulated on the incline of the rectangular prism.

15 8. The polarized light color filter according to claim 2 formed by accumulating the first, second and third polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements and the first wide-band polarization spectroscopic element on the transparent substrate.

20 9. The polarized light color filter according to claim 2, wherein the first, second and third polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements and the first wide-band polarization spectroscopic element are accumulated and interposed between the inclines of the two pieces of the rectangular prisms, which forms a rectangular parallelepiped when joint by their inclines.

10. The polarized light color filter according to claim 2 formed by accumulating the first, second and third polarized light converting elements,

the first, second and third narrow-band polarization spectroscopic elements and the first wide-band polarization spectroscopic element on the incline of the rectangular prism.

5 11. The polarized light color filter according to claim 3 formed by accumulating the first, second, third and fourth polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements, and the first wide-band polarization spectroscopic element on the transparent substrate.

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12. The polarized light color filter according to claim 3 formed by accumulating the first, second, third and fourth polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements, and the first wide-band polarization spectroscopic elements
15 between the inclines of the two pieces of the rectangular prisms, which forms a rectangular parallelepiped when joined by their inclines.

20 13. The polarized light color filter according to claim 3 formed by accumulating the first, second, third and fourth polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements, and the first wide-band polarization spectroscopic element on the incline of the rectangular prism.

25 14. The polarized light color filter according to claim 4 formed by accumulating the first, second, third and fourth polarized light converting elements, the first, second and third narrow-band spectroscopic elements, and the first and second wide-band polarization spectroscopic elements on the transparent substrate.

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15. The polarized light color filter according to claim 4 formed by accumulating the first, second, third and fourth polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements, and the first and second wide-band polarization spectroscopic 5 elements and interposed between the inclines of two pieces of the rectangular prisms, which form a rectangular parallelepiped when joined by their inclines.

16. The polarized light color filter according to claim 4 formed by 10 accumulating the first, second, third and fourth polarized light converting elements, the first, second and third narrow-band polarization spectroscopic elements, and the first and second wide-band polarization spectroscopic elements on the incline of the rectangular prism.

15 17. A video projector, comprising the polarized color filter according to claim 5, claim 6, claim 7, claim 8, claim 9, claim 10, claim 11, claim 12 or claim 13, wherein the reflection optical modulating element is provided on the emission side of said polarized light color filter; the projection lens is provided on the non-emission side of said polarized light color filter; the 20 three primary lights to be emitted to said reflection optical modulating element from said polarized light color filter are controlled on the time-division basis by controlling the voltages applied to the first, second and third polarized light converting elements.

25 18. The video projector, comprising the polarized light color filter according to claim 5, claim 6, claim 7, claim 8, claim 9, claim 10, claim 11, claim 12 or claim 13, wherein the sequential transmission optical modulating element and the projection lens are provided on the emission side of said polarized light color filter, and the voltages applied to the first, second and

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third polarized light converting elements are controlled so that the three primary lights to be emitted to said transmission optical modulating element from said polarized light color filter can be controlled on the time-division basis.

19. The video projector, comprising the polarized light color filter according to claim 14, claim 15 or claim 16, wherein the reflection optical modulating element is provided on the emission side of said polarized light color filter while providing the projection lens on the non-emission side, and
10 the voltages applied to the first, second, third and fourth polarized light converting elements are controlled so that the three primary lights to be emitted to said reflection optical modulating element from said polarized light color filter can be controlled on the time-division basis.

15 20. The video projector, comprising the polarized light color filter according to claim 14, claim 15 or claim 16, wherein the sequential transmission optical modulating element and the projection lens are provided on the emission side of said polarized light color filter, and the voltages applied to the first, second, third and fourth polarized light converting
elements are controlled so that the three primary lights to be emitted to said transmission optical modulating element can be controlled on the time-
20 division basis.

21. The video projector according to claim 19, wherein the reflection optical modulating element is provided on one of the emission sides of the polarized light color filter, and the 1/4 wave plate and the total reflection mirror are sequentially provided on the other transmission side.
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22. The video projector according to claim 19, wherein the reflection

optical modulating element is provided on one of the emission sides of the polarized light color filter, and the second reflection optical modulating element, having an identical structure with that of said reflection optical modulating element, is provided on the other emission side of said polarized
5 light color filter.